



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------------------|-----------------------------|
| 10/562,736 | 05/22/2006 | Yukihiro Kiuchi | Q92480 | 7773 |
| 23373 7590 07/08/2011 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 | | | EXAMINER FEELY, MICHAEL J | |
| | | | ART UNIT 1761 | PAPER NUMBER |
| | | | NOTIFICATION DATE 07/08/2011 | DELIVERY MODE ELECTRONIC |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM
USPTO@SUGHRUE.COM

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/562,736 | Applicant(s) KIUCHI ET AL. | |
| | Examiner MICHAEL J. FEELY | Art Unit 1761 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-55 is/are pending in the application.
- 4a) Of the above claim(s) 20-50,54 and 55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-19 and 51-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Pending Claims

Claims 1 and 5-55 are pending.

Election/Restrictions

1. Applicant's election without traverse of:
 - *Group I (claims 1, 5-19, & 51-53; and added claims 54 & 55);*
 - *The phenol resin of formula (3); and*
 - *The epoxy resin of formula (11), in the reply filed on January 4, 2010 has been acknowledged.*
2. Claims 20-50 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 4, 2010.
3. The amendment entered with the request for continued examination on December 30, 2010 necessitated a new species election requirement. Specifically, the previously elected *phenol of formula (3)* was omitted from new claims 54 & 55; and the previously elected *epoxy resin of formula (11)* was deleted from claim 1 and omitted from new claim 55. Accordingly, the previous species election requirement (*mailed December 4, 2009*) was withdrawn.
4. Applicant's election without traverse of:
 - *The phenol resin of formula (3); and*
 - *The epoxy resin of formula (13), in the reply filed on June 9, 2011 is acknowledged.*

Art Unit: 1761

5. Accordingly, claims 54 and 55 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on June 9, 2011.

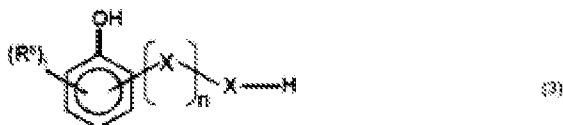
Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 6, 8-19, and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiuchi et al. (WO 01/42360 A1 or US Pat. No. 6,730,402 B2 or US 2003/0152776 A1). The WIPO document, US Patent, and US Publication are *equivalent documents*. Accordingly, all citations are drawn to the US Patent, which serves as a translation document for the WIPO document.

Regarding claims 1, 6, 8-19, and 51-53, Kiuchi et al. disclose: **(I)** an epoxy resin composition (column 3, lines 1-14; claims 27-29) comprising: an epoxy resin (A) (column 3, lines 9-14; claims 27-29) and an epoxy resin curing agent (B) (column 3, lines 4-8; claims 27-29);

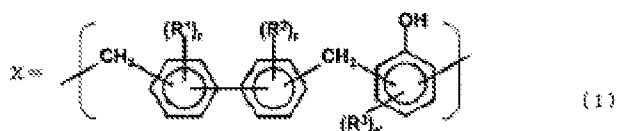
said epoxy curing agent (B) including a phenol resin (F) represented by general formula (3):



Art Unit: 1761

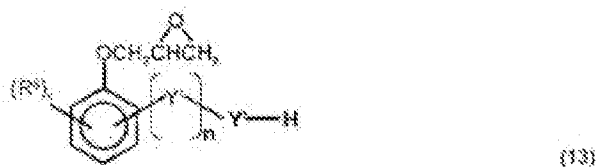
where R^6 represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, t represents an integer from 0 to 4, and n is more than 10 to less than 75 (column 9, lines 26-43; column 14, lines 58-64; claims 27-29);

wherein X is represented by the following general formula (1):



where R^1 , R^2 , and R^3 each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, each r independently represents an integer from 0 to 4, and r' represents an integer from 0 to 3; wherein X is obtained by reaction between a phenol-based compound and a biphenyl isomer or a mixture of biphenyl isomers (see 1st & 3rd structures below columns 5 & 6);

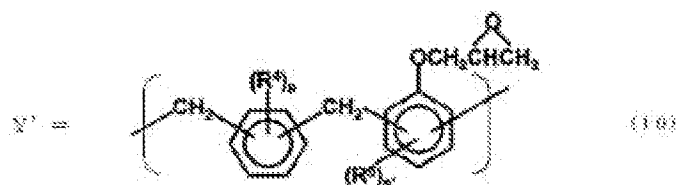
said epoxy resin (A) includes an epoxy compound (G) represented by general formula (13):



where R^6 represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, t represents an integer from 0 to 4, and n is 0 to 10 (column 9, lines 26-43; column 10, lines 45-63; column 14, lines 58-64; claims 27-29);

where Y' is represented by the following general formula (10):

Art Unit: 1761



where R^4 and R^5 each independently represents hydrogen or a monovalent substituent having 1 to 3 carbon atoms, s represents an integer from 0 to 4, and s' represents an integer from 0 to 3; wherein Y' is obtained by epoxidation of a product by reaction between a phenol-based compound and a benzene isomer or a mixture of benzene isomers (see 4th & 5th structures in columns 11 & 12); and

further comprising an inorganic filler (C), wherein the inorganic filler (C) is aluminum hydroxide (C') (column 15, lines 16-34; claims 36 & 37);

(6) further comprising a curing promotion catalyst (D) (column 18, lines 15-36);

(8) further comprising a rubber component as a flexibilizer (column 18, lines 39-40);

(9) further comprising a silane coupling agent (column 18, lines 44-67);

(10) further comprising a mercapto compound (column 18, lines 60-61);

(11) further comprising at least one of a nitrogen-containing curing agent (column 10, lines 20-23) and an inorganic flame retardant (column 20, lines 24-35);

(12) a varnish solution comprising: an organic solvent; and the epoxy resin composition according to claim 1 or 5 which is dissolved or dispersed therein (column 20, lines 36-41; claim 38);

(13) a prepreg material comprising: a resin sheet in a semi-cured state, obtained after a process including impregnating a base material with the varnish solution according to Claim 12, followed by removal of the solvent (column 20, lines 36-44; claim 39); (14) a laminate

Art Unit: 1761

comprising: the prepreg material according to Claim 13 (column 20, lines 44-58; claims 58-66 & 69); **(15)** a copper-clad laminate comprising: the prepreg material according to Claim 13; and a copper foil which is adhered to one surface thereof (column 20, lines 44-48);

(16) a copper foil provided with a resin, produced by a process comprising the step of: applying the varnish solution according to Claim 12 onto a surface of a copper foil (column 20, lines 36-48);

(17 & 51) a printed circuit board comprising: a copper foil; and a resin material laminated thereto, the resin material being only formed of an epoxy resin composition or being formed of a base material containing an epoxy resin, said epoxy resin composition containing the epoxy resin composition according to claims 1 or 5 and being in a semi-cured state or in a cured state (column 20, lines 58-65); **(18 & 52)** wherein the resin material includes a prepreg material comprising a resin sheet in a semi-cured state, which is obtained after a process including the steps of: impregnating a base material with a varnish solution which contains an organic solvent and an epoxy resin composition dissolved or dispersed therein; and removing the solvent therefrom (column 20, lines 36-65); **(19 & 53)** wherein the resin material includes the epoxy resin composition applied on the copper foil (column 20, lines 36-65).

Kiuchi et al. fail to explicitly disclose: wherein the epoxy curing agent (B) features an n value of more than 10 to less than 75, and wherein the epoxy resin (A) features an n value of 0 to 10. Rather, they disclose: “The phenolic resin (C) (*corresponding to instant component (B)*) and the epoxy resin (D) (*corresponding to instant component (A)*) both contained in the flame-retardant epoxy resin composition of the present invention have *no particular restriction as to their weight average molecular weights*. The molecular weights are, for example 300 to 10,000.

Art Unit: 1761

These weight-average molecular weights can be measured by GPC,” (*see column 11, lines 58-64*). The skilled artisan would have recognized that the instantly claimed *n* ranges yield molecular weight values that overlap with the disclosed weight average molecular weight range. Accordingly, it would have been obvious provide (B) and (A) with the instantly claimed *n* values in the composition of Kiuchi et al., so long as the (OH/Ep) ratio between these materials is greater than or equal to 0.7 and less than or equal to 2.5. This proper ratio ensures adequate crosslinking, which in turn ensures adequate flame retardance, heat resistance, and strength of the cured material (*see column 14, line 65 through column 15, line 15*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide (B) and (A) with the instantly claimed *n* values in the composition of Kiuchi et al., so long as the (OH/Ep) ratio between these materials is greater than or equal to 0.7 and less than or equal to 2.5, because Kiuchi et al. disclose: (a) that these materials have no particular restriction as to their weight average molecular weight; (b) that the molecular weight ranges from 300-10,000 (*the instantly claimed n ranges yield molecular weight values that overlap this range*); and (c) that the proper (OH/Ep) ratio ensures adequate crosslinking, which in turn ensures adequate flame retardance, heat resistance, and strength of the cured material.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kiuchi et al. (WO 01/42360 A1 or US Pat. No. 6,730,402 B2 or US 2003/0152776 A1) in view of Nakamura et al. (US Pat. No. 6,645,630).

Art Unit: 1761

Regarding claim 5, the teachings of Kiuchi et al. are as set forth above and incorporated herein. They fail to explicitly disclose: (5) wherein the 50 mass% average particle diameter (D_{50}) of the aluminum hydroxide (C') is 0.5 to 20 μm .

Nakamura et al. disclose a similar flame-retardant composition used for prepregs and multilayer printed wiring boards (*see Abstract; column 2, lines 10-45*). They disclose that their aluminum hydroxide filler has an average particle diameter of greater than 0.05 microns to less than 30 microns (*preferably 5 microns*). This particle size helps to: (a) reduce water absorption, (b) increase strength upon heating, (c) reduce dimensional change upon heating, and (d) improve transparency of the molded article (*see column 3, lines 32-51*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an aluminum hydroxide with the instantly claimed average particle diameter, as taught by Nakamura et al., in the composition of Kiuchi et al. because Nakamura et al. discloses that this average particle size helps to: (a) reduce water absorption, (b) increase strength upon heating, (c) reduce dimensional change upon heating, and (d) improve transparency of the molded article.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kiuchi et al. (WO 01/42360 A1 or US Pat. No. 6,730,402 B2 or US 2003/0152776 A1) in view of Takada et al. (JP 2002-241590).

Regarding claim 7, the teachings of Kiuchi et al. are as set forth above and incorporated herein. They fail to explicitly disclose: (7) further comprising one of a phenoxy resin containing an epoxy group and a phenoxy resin containing no epoxy group.

Art Unit: 1761

Takada et al. disclose a similar flame-retardant composition used for prepregs and multilayer printed wiring boards (*see Abstract; paragraphs 0001, 0006, and 0061*). They disclose that the addition of a phenoxy resin is advantageous to the impregnating composition. Specifically, it allows for a good roughened surface to be acquired without having to add standard roughening ingredients. Furthermore, the phenoxy has good flame retardancy properties, and the high glass transition temperature of the phenoxy resin enhances the heat-resistance properties of the molding.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed phenoxy resin, as taught by Takada et al., to the flame retardant composition of Kiuchi et al. because Takada et al. disclose that the addition of a phenoxy resin: (a) allows for a good roughened surface to be acquired without having to add standard roughening ingredients; (b) enhances flame-retardance; and (c) enhances heat-resistance properties of the molding.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting

Art Unit: 1761

ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 6, 8-19, and 51-53 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the combined limitations of claims 27-29, 36-39, 58-66, and 69 of U.S. Patent No. 6,730,402. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

- The combined limitations of patented claims 27-29 and 36-39 obviously satisfy the limitations of claims 1, 12, and 13;
- The combined limitations of patented claims 58-66 and 69 obviously satisfy the limitations of claim 14;
- The limitations of claims 6, 8-11, 15-19, and 51-53 would have been obviously envisaged in light of the patent's specification (*see prior art rejection above in section 5 for specific citations*) – *See: In re Vogel*, 422 F.2d 438, 441-42, 164 USPQ 619, 622 (CCPA 1970); MPEP 804, II, B, 1.

12. Claim 5 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the combined limitations of claims 27-29, 36-39, 58-66, and 69 of U.S. Patent No. 6,730,402 in view of Nakamura et al. (US Pat. No. 6,645,630). Claim 5 is obviously satisfied for the reasons set forth above in section 8.

Art Unit: 1761

13. Claim 7 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over the combined limitations of claims 27-29, 36-39, 58-66, and 69 of U.S. Patent No. 6,730,402 in view of Takada et al. (JP 2002-241590). Claim 7 is obviously satisfied for the reasons set forth above in section 9.

Response to Arguments

14. Applicant's arguments (see response filed December 2, 2010) have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 1761

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL J. FEELY whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL J FEELY/
Primary Examiner, Art Unit 1761

June 30, 2011